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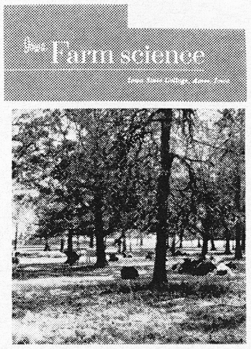
Iowa Farm science

Iowa State College, Ames, Iowa

These cows in a wooded pasture near Boone don't seem greatly concerned. But they or their beef counterparts may benefit nutritionally from studies with an artificial rumen at Iowa State College. Researchers are seeking to increase the feeding value of forages through improved rumen function (see item on page 18).



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chat with the editors

IOWA FARM SIZE GOES UP . . .

Average size of farms in Iowa has been trending upward since the 1880's. From 1950 to 1954, our "average" farm crept from about 169 to 176½ acres.

We most often think of farm size in terms of acres, but Iowa farms are growing in other dimensions, too. Volume of business, income and expense figures, cropland harvested, net worth and investment are among other measures. About 88 percent of our present farms, for example, reported at least one tractor in 1954. But even with 12 percent (mostly "nominal farms") without a tractor, the total number of tractors on Iowa farms makes for an average of nearly two per farm.

For more details on the growth in farm size, read the article by Gene Wunderlich and John Timmons beginning on page 3. And, if the term "nominal farms" caught your eye, be sure to read "Iowa's 'Farms in Name Only'" coming up in the November issue of Iowa Farm Science.

* * *

We all know that livestock prices dropped last year. If you're interested in the "why" (beyond the surface, that is), look into Sam Thompson's situation report and analysis starting on page 7.

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Iowa farm size continues UP!

Farm size in Iowa is increasing in acreage as well as in other dimensions. Here's a look at what's happening and at some of the many reasons and forces—both within and outside of agriculture—behind it.

by Gene Wunderlich and John F. Timmons

IOWA'S "average" farm is about 8 acres larger than in 1950. The 1954 Census of Agriculture shows an average acreage of 176.5 acres per farm. The average reported in the 1950 census was 168.7 acres.

Average farm size in Iowa has been growing since about 1880 (see chart 1). This is part of a general national trend toward larger farms, fewer farm people, more mechanization and greater production. In the earlier years, growth was more rapid in Iowa than in the rest of the nation. Since 1930 growth for the nation as a whole has been relatively more rapid. Farm size increased in all states from 1950 to 1954, but the rate of increase for the nation was higher than that for Iowa.

Let's look more closely at what has happened. How has this growth come about? And what can we expect in the next 5-10 years?

Farms and Farmers . . .

The amount of land in Iowa farms has been fairly constant since 1900. It has even decreased slightly in the last 10 years (see table 1). So expansion in farm size hasn't come through the cultivation of new land but by a reduction in the number of farms.

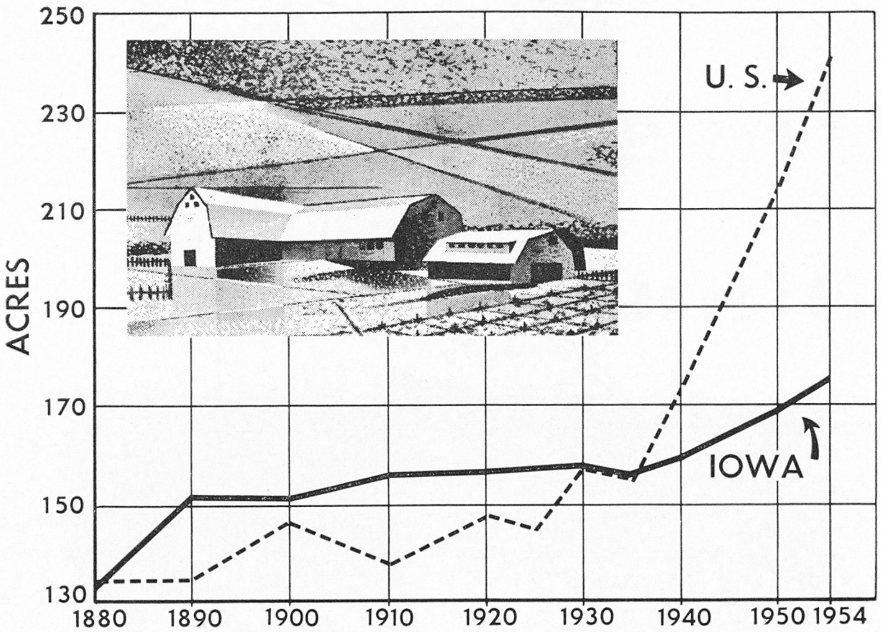
There were 10,226 fewer Iowa farms in 1954 than in 1950—about a 5-percent drop in a little less than 5 years. This is the largest decrease in farm numbers in any 5-year census period of Iowa's history. In the 10 years since World War II, the drop has been 16,001 farms—also a record decline for any 10-year period.

TABLE 1. Farms in Iowa, 1900-54.

	1900	1945	1950	1954
Land in farms (acres)	34,574,337	34,453,936	34,264,639	34,044,533
Average size farm (acres)	151.2	164.9	168.7	176.5
Proportion of land in farms (percent)	97.2	96.2	95.5	94.9
Number of farms	228,622	208,934	203,159	192,933

GENE WUNDERLICH is agricultural economist, Agricultural Research Service, USDA, and JOHN F. TIMMONS is professor of agricultural economics, Iowa State College.

CHART 1. Average Farm Size, U. S. and Iowa, 1880-1954.



Large Get Larger . . .

The reduction in farm numbers is coming about in the medium and medium-small farm sizes. Both the large and very small farms have increased in numbers. All farm size groups over 220 acres showed increases. All size groups between 3 and 220 acres showed decreases. The largest group of farms — containing the average-size farm of 176.5 acres —had a 6.7-percent drop. The number of farms under 3 acres increased. (See chart 2.)

Large farm operation has been made more attractive and feasible by such factors as increased mechanization, new techniques, larger capital outlays and joint operations by partnership and leasing arrangements. Most of the farm

The percentage decline in Iowa farm numbers is only about half that of the entire nation. From 1950 to 1954, the number of farms in the nation dropped from 5,382,162 to 4,782,393, or slightly over 11 percent. At the same time, national average farm size increased from 215.3 to 242.2 acres.

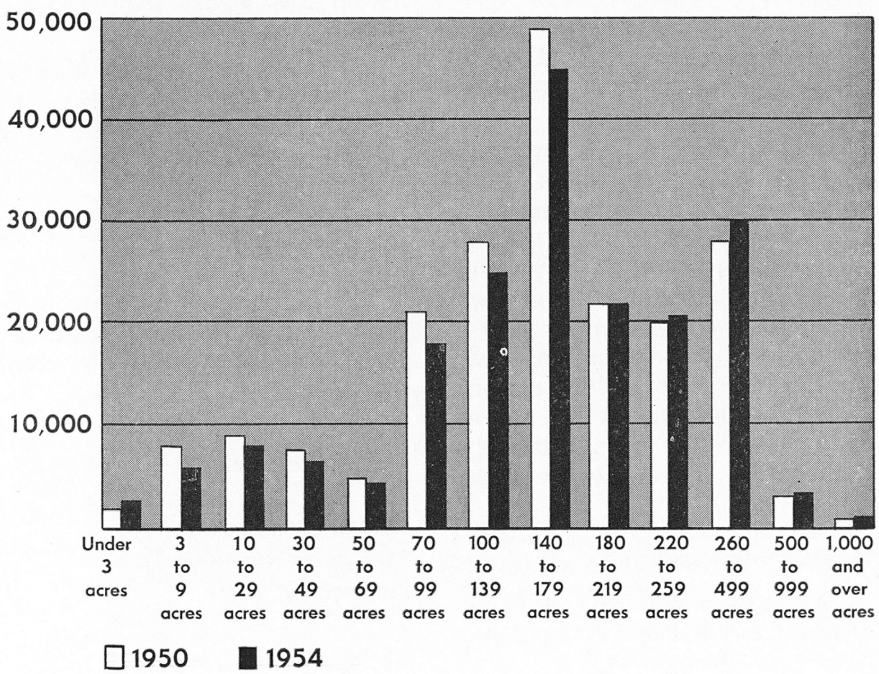
The number of farm operators closely follows the number of farms—varying only in cases of joint operators. While the number of Iowa farm operators living on their farms has dropped from 191,759 to 182,785, operators not residing on their farms have increased from 7,096 to 7,725. This is probably due largely to increases in the number of farm units of 220 acres and over where operators reside in town. Part of the increase in nonresident operators may also be accounted for by retiring farm parents moving to town and leaving one of their children on the home farm.

Total farm operators in Iowa have declined about 5 percent. But the change hasn't been uniform. The number of tenants dropped 4.4 percent, and the number of full owners decreased 7.4 percent. The number of part owners increased 1.2 percent. This indicates that renting of additional land is a factor in the increasing size of farm units.

TABLE 2. Numbers of Iowa Farms in Economic Classes, 1950-54.

Economic class	Value of farm products sold	1950	1954	Percentage change (1950-54)
I	($25,000 and more)	7,330	10,317	+40.8
II	($24,999-$10,000)	44,203	52,134	+17.9
III	($ 9,999-$ 5,000)	67,866	59,884	—11.8
IV	($ 4,999-$ 2,500)	40,605	33,823	—16.7
V	($ 2,499-$ 1,200)	19,011	15,430	—18.8
VI	($ 1,199-$ 250)	8,702	6,660	—23.5
Other		15,442	14,771	— 4.3

CHART 2.
Number of Farms by Size Groups, Iowa, 1950 and 1954



number losses in the medium-size group may be attributed to swelling of farms of the larger sizes.

The number of very small farms has grown by less than 900 but represents a 42.8-percent increase (see chart 3). Most of the increase in these units can be charged to residential, part-time and specialty farms.

In terms of actual cropland harvested, the picture is about the same. From 1950 to 1954 there were 103,047 acres less cropland harvested. Average cropland harvested is 124.4 acres for those farms reporting. This represents a 5.2-percent increase in average cropland harvested. There was an increase in the number of farms with 200 acres or more of cropland harvested but a decrease in the number of farms in the smaller size groups.

How Big Is a Farm?

Usually we think of farm size in terms of acres. And perhaps acreage is a fairly good rough measure for comparison of the same type of farm in a local area —where soil and climatic conditions are much the same. But conditions vary over the state, and it's possible that a big farm acrewise may be a small farm incomewise and vice versa. Total acres, cropland acres, gross or net income, asset value, total expenditures and net worth, among others, are all useful measures. But we have to be careful not to read more meaning into a statistic than is actually there.

The Census of Agriculture uses the "economic class" as one value measure of a farm (see table 2). It appears that Iowa's fewer farms are moving into the higher sales brackets. Classes I and II showed increases in numbers of farms from 1950 to 1954; all other classes lost. However, the index of prices received for all farm products in Iowa rose nearly 7 percent during 1949-54. So a part of the increase in classes I and II may have been due to this rise alone.

Iowa farms also have more livestock and equipment. There were 169,744 farms reporting *at least* one tractor in 1954—over 8,000 more farms than in 1950, for example. These same farms accounted for a total increase of 70,632 tractors in the 5-year period — making the state average virtually two tractors per farm! Though 11,000 fewer farms reported sales of livestock, the total value of livestock sales increased nearly 97 million dollars.

The census data don't provide the information needed for all measures of farm size. But from the information that is available, it's apparent that Iowa's farms are enlarging in many dimensions —not in acreage alone.

State Variation . . .

Average farm size in almost all counties increased from 1950 to 1954. The only exceptions were slight decreases in Osceola, Winnebago and Muscatine counties— though they showed increases over the longer period 1945-54. Largest increase in average farm size from 1950 to 1954 was in Polk County, even though its average farm size remains one of the smallest in the state.

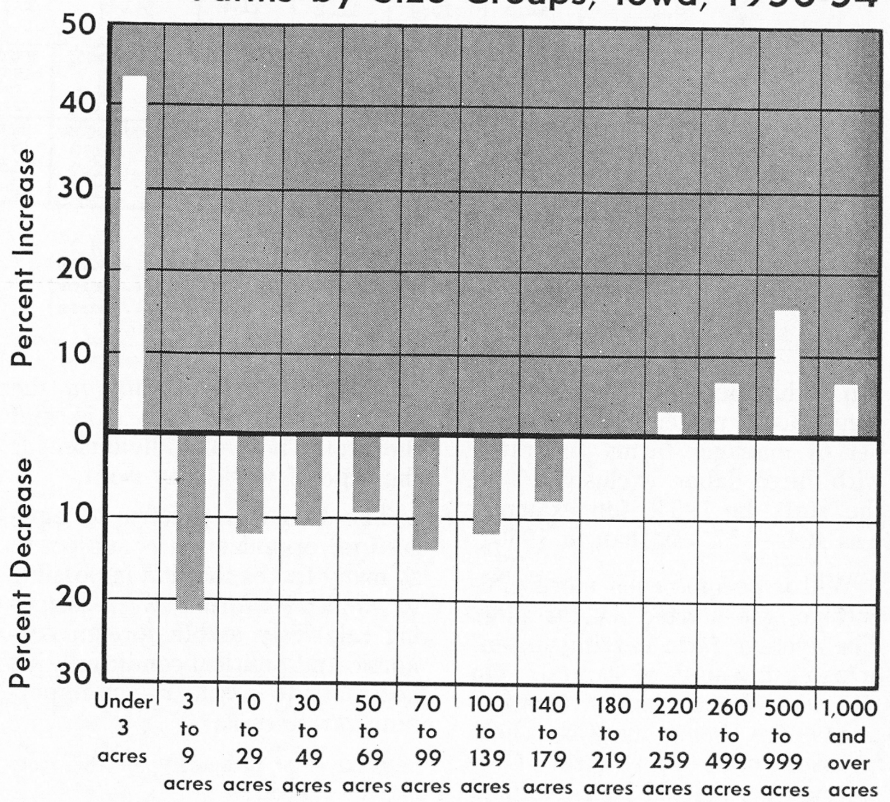
The map shows the 1954 average size of farm by counties, the increase since the previous census and the increase since World War II. Farm size in the northwestern counties, though above the state average, has made small gain compared with other parts of the state. The southern counties have made the largest relative gains.

What Does It Mean?

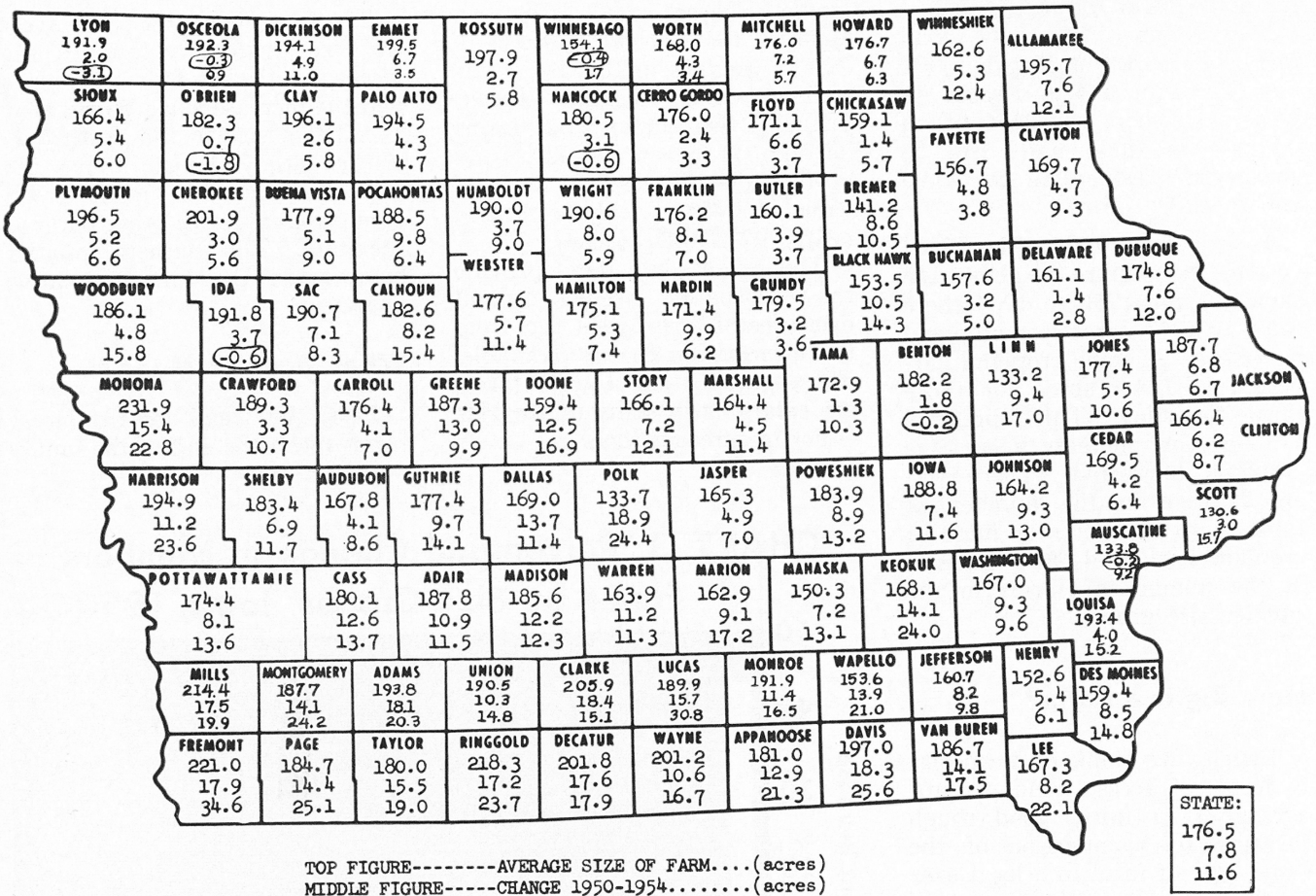
Does the trend toward larger farms mean the end of the family farm? Probably not—at least in the foreseeable future. The pattern of farm organization may be expected to remain that of one operator furnishing mainly his own capital and supplying the bulk of the labor himself or with his family.

Efficiencies gained through larger size will probably continue pressure toward expansion — but within limits and not faster than

CHART 3. Percentage Change in Numbers of Farms by Size Groups, Iowa, 1950-54



Average Farm Size in Acres by Counties, Iowa, 1954.



TOP FIGURE--------AVERAGE SIZE OF FARM....(acres)
MIDDLE FIGURE-----CHANGE 1950-1954.....(acres)
BOTTOM FIGURE-----CHANGE 1945-1954.....(acres)

can be handled within present organizational patterns. The number of manager farms (operated with hired labor exclusively) in the state in 1954, for example, was 404—157 less than in 1950.

Will it become even more difficult to get started in farming? The average farm is requiring increasing amounts of capital. On the other hand, family arrangements are being used to help young farmers get started. Others may get started by combining with nonrelatives who have the necessary capital or land. Livestock-share arrangements (many of which are or are very similar to partnerships), for example, increased in the 1950-54 period, even though tenancy as a whole decreased.

To the extent that there are economic pressures to move off the farm into higher paying employment, it may be expected that getting started in farming will be less attractive. The relative ease or difficulty will depend on the circumstances of each case and the preferences of individuals for the type of work they want.

The long-run pattern of agricultural organization is subject to so many forces that it's impossible to predict its form. Even assuming relatively stable foreign economic and political conditions, it's necessary to consider such important variables as:

- Level of prosperity for the economy as a whole;
- The returns that can be earned by labor and capital in other industries. Both returns to these factors and the pattern of organization would be affected by any dramatic changes in the demand for farm products or important technological developments;
- The ability and willingness of some of the farm population to transfer out of agriculture;
- Costs of moving out of agriculture. An important factor here is the urbanization and industrialization in the immediate locality;
- The value structure and preferences of farm people in how much money income they may be willing to sacrifice to continue farming; and
- Governmental programs of temporary or "permanent" natures.

Many of the forces which influence farm size are within the organization of the farm firm. Cost economies of larger farms may also be restricted by limitations on available capital, management, uncertainty and government programs. But we mustn't lose sight of the broader economic framework. The cost and return relationships of the farm firm depend on many forces completely outside of agriculture. Neither can we ignore the possibilities of new organizational patterns which might allow faster expansion of farms.

A significant change in any one of these outside forces could have a marked effect on average farm size.

Why The Livestock Price Slump?

by Sam H. Thompson

It wasn't just the hog or cattle situation alone. Both cattle and hog numbers crested in 1955; the output of meat was enormous. This is one reason. There were also other factors indicating a need for production adjustments.

SHARP DECLINES in live hog and cattle prices in 1955 greatly reduced farm returns and caused much concern. Producers were puzzled as to why these declines occurred when employment in industry was high and payrolls at a peak. Some plausible answers have come to light in the months that have followed. But there's still some confusion about the underlying causes of the difficulty and about possible approaches to improvement.

SAM H. THOMPSON is professor of agricultural economics.

Meat Production . . .

Most meat produced in the United States is used for home consumption. Exports of tallow, lard and some meat products—though smaller than during World War II—are fairly large in total value. In general, however, they're a relatively small proportion of our national production.

Chart 1 shows total production and civilian consumption of red meat—beef and veal, lamb and mutton, and pork (excluding lard) from 1909 to 1955. With but two exceptions, 1935 and 1937, production has generally exceeded consumption.

During World Wars I and II, and particularly during the latter period, production was especially greater than home consumption.

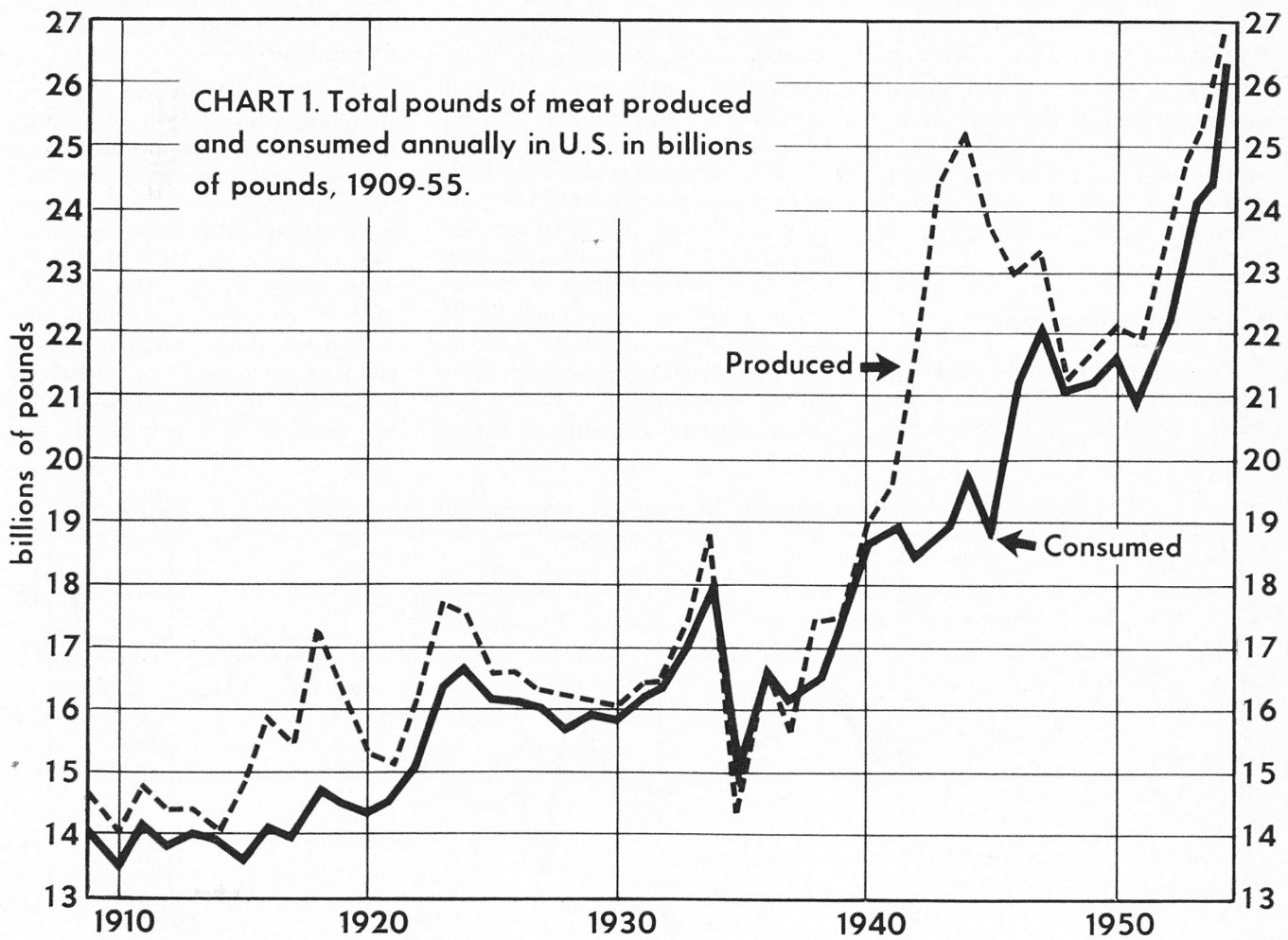


CHART 1. Total pounds of meat produced and consumed annually in U.S. in billions of pounds, 1909-55.

Wartime exports of meats were relatively large. And exports tended to remain large for a time after the wars.

The total production trend has been upward since 1909. But the trend has by no means been a smooth curve. The year 1955, with the largest total marketings of meat in history, came at a point near the peak of the sixth cattle numbers cycle. Other peaks of cattle numbers during the 47-year period occurred in January, 1918, 1934 and 1945. And the peaks in cattle numbers on farms came in the same years as did peak production of meat in 1918 and 1934. The fifth cattle numbers peak in 1945 was associated with a year of very large meat production—though its output was slightly overshadowed by the large wartime efforts of 1943-44. The bulge in meat production in 1923 and 1924 came at a time of relatively high hog production.

Low points in cattle numbers during the 47-year period came in January of 1912, 1928, 1938 and 1949. And there was a tendency for relatively small meat production in the years which followed.

So it appears that the rather violent swings of the cattle numbers cycle have a large influence on the total pounds of meat available in the years immediately following a peak or low point in numbers.

Meat Consumption . . .

The supply of red meat has been increasing irregularly since 1909. What has been the trend in consumption per person? The answer is shown in chart 2 which is based on data from the USDA Agricultural Marketing Service. The total amount of meat consumed has been divided by the population for each year. Total amount consumed per person varies from 115.8 pounds in 1935 to a record of 160.7 in 1955.

The amount of meat consumed per person since 1940 appears to be substantially greater than in the 31 years before. In 14 of the 16 years beginning with 1940, pounds of red meat consumed per person exceeded 140 pounds. In the previous 31 years, that figure was exceeded only 8 times. So it's apparent that we've increased our average meat consumption considerably since 1939.

Not only was consumption of meat in pounds per person at a record peak in 1955; in point of time, it closely followed the second-high of all time — 153.1 pounds—in both 1953 and 1947. The third highest was 153 pounds in 1909, and the fourth highest, 152.6 pounds, was in 1954.

Chart 3 shows the annual production for beef and veal, pork (excluding lard), and lamb and mutton for the 11-year period 1945-55. Remember that January 1945 was the peak in the fifth cattle numbers cycle and that January 1955 was the sixth successive annual increase in cattle numbers since the low point of 1949.

An important characteristic of the sixth cattle numbers cycle is the rapid buildup in numbers after the 1949 low point. In 6 years, the number of all cattle on farms and ranches increased 26 percent. Production of beef, which reached a low point in the present cycle in 1951 (2 years after the 1949 low in cattle numbers), had increased 53 percent by 1955. Pork production (excluding lard) was 11 percent greater in 1955 than in the previous year.

Thus, in 1955, the cattle numbers cycle and the hog numbers cycle crested in the same year, and the accompanying output of meat was enormous—with the increase in beef much larger than that of pork.

Pounds of beef, pork and total red meat consumed per person in the United States for the 11-year period 1945-55 is shown in chart 4. Except for 1 year of the first 8, pork consumption per person was greater than that for beef. In 1953 per person beef consumption pulled ahead of pork. Per person beef consumption in 1953 was 76.5 pounds; in 1954, 79 pounds; in 1955, a record 80.9 pounds. Meanwhile, per person consumption of pork (excluding lard) in 1952 was 62.6 pounds; in 1953, 59.2 pounds; and in 1955—65.9 pounds.

In 1951, at the low point in slaughter of the sixth beef cattle numbers cycle, the proportion of all red meat consumed was 40.6 percent beef and 52.1 percent pork. In actual pounds, consumption of pork in 1951 and 1955 were about equal. But in 1955 only 41 percent of all meat consumed was pork (excluding lard). Beef consumption increased 57 percent in the same period; and in 1955 beef represented 50.3

CHART 2. Meat consumption in pounds per person annually in U.S., 1909-55

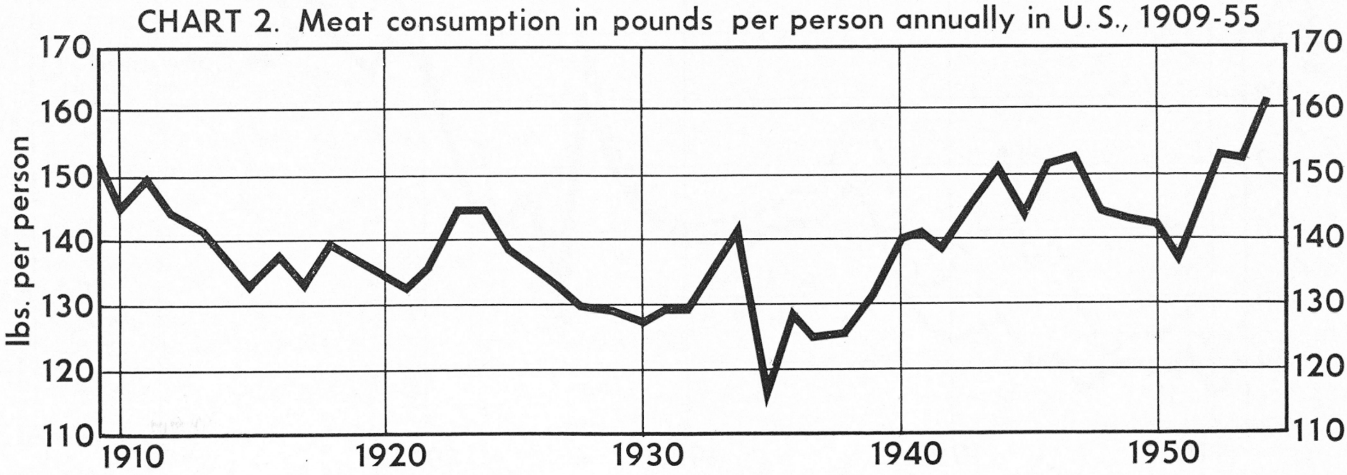


CHART 3. Annual U.S. meat production in billions of pounds, 1945-55.

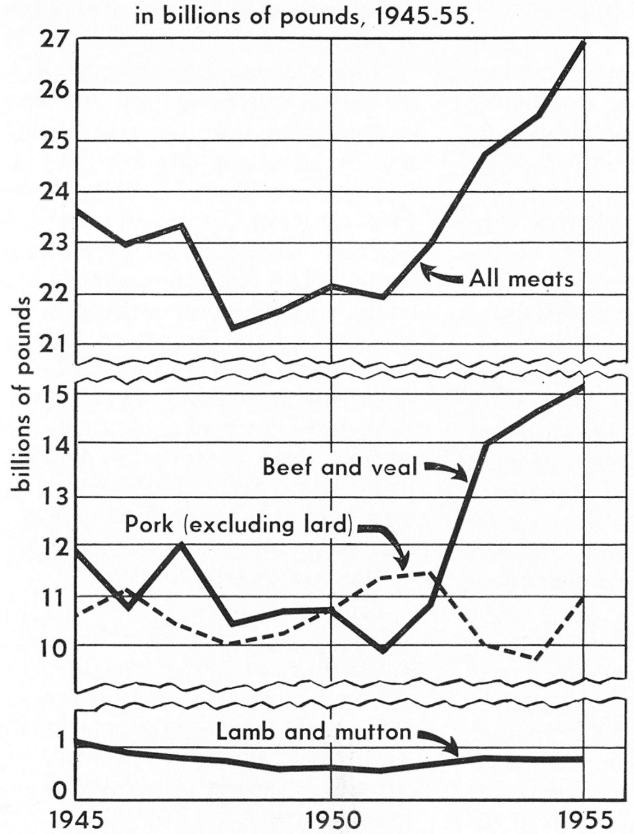


CHART 4. Pounds of meat consumed per person annually in U.S., 1945-55.

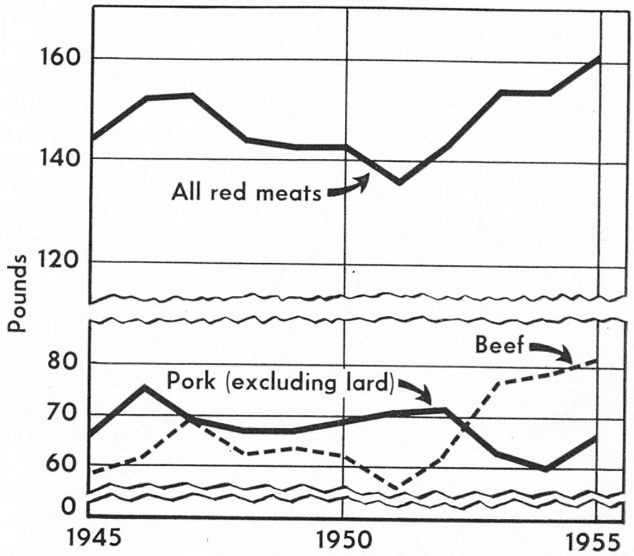
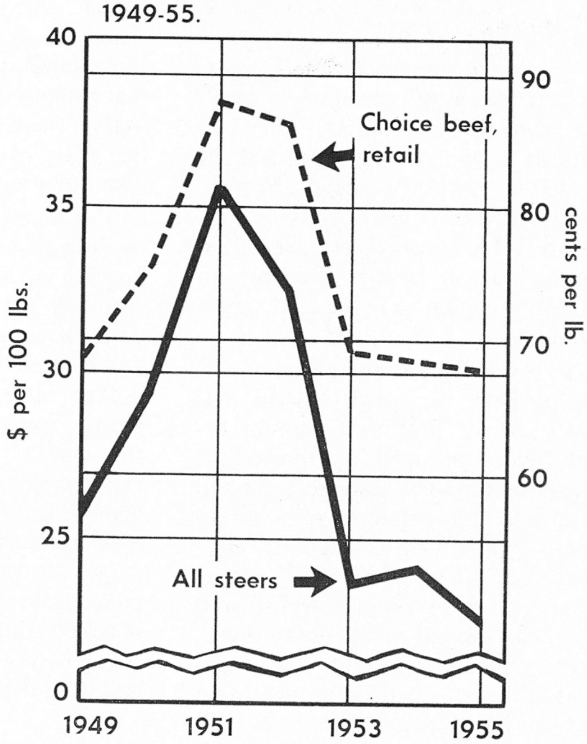


CHART 5. Annual average prices: all grades of slaughter steers at Chicago per 100 pounds and retail prices per pound of choice beef, 1949-55.



percent of all red meat consumed. From 1951 to 1955, production of red meat increased 23 percent; total U.S. consumption increased 27 percent; consumption per person increased 18 percent.

There has been a sharp upward trend in production of all red meats since 1951. And, with the single exception of 1954, there has been a steady upward trend in consumption per person. What has been the result of this situation in terms of prices to farmers for cattle and hogs and to consumers for beef and pork?

Prices . . .

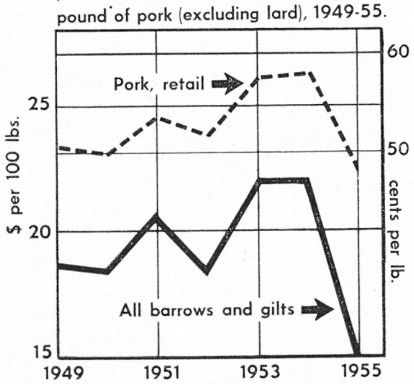
Chart 5 shows the annual average prices of all grades of slaughter steers at Chicago and of choice-grade beef at retail for 1949-55. Remember again that January 1949 was the low point of the sixth cattle numbers cycle and that 1951 was the low year of beef production for that cycle.

With beef slaughter declining, the price per pound of beef at retail moved up from 68.4 cents to 88.2 cents in 1951. And the price of all weights of live steers at Chicago rose from $25.80 to $35.72 per 100 pounds. Since slaughter after 1951 increased continuously and sharply each year and increased the total output of beef, the main trend in retail prices has been down — from 88.2 cents in 1951 to 67.7 cents in 1955. Prices for live steers have followed the same general pattern — from $35.72 per 100 pounds in 1951 to $22.59 in 1955. Live steer prices made a slight recovery in 1954.

Looking at Pork Alone . . .

However, chart 6 shows the annual prices of pork at retail and

CHART 6. Annual average prices: all grades of barrows and gilts at Chicago per 100 pounds and retail prices per pound of pork (excluding lard), 1949-55.



the annual prices of all weights of barrows and gilts at Chicago. In 1949-50 pork at retail was relatively stable at 50.6 and 50.3 cents per pound. In 1951—with relatively small supplies of all meat—pork rose to 54.3 cents at retail. Following a decline in 1952, pork at retail rose to a high of 58.3 cents in 1954 and in 1955 declined to a low of 49.2 cents for the period.

Prices of barrows and gilts, meanwhile, acted similarly—moving from a low of $18.62 per 100 pounds in 1950 to a high of $20.74 in 1951. After a slight drop in 1952, the next 2 years were $22.03 and $22.13, respectively. In 1955, there was a sharp decline to $15.16 — down 31 percent from 1954.

So even when we restrict our comparison to pork alone for 1949-55, we find that annual retail prices as well as liveweight prices of barrows and gilts moved as might be expected—in directions opposite to changes in supplies of pork. In 1951 alone, when prices of pork at retail and live hogs moved in the same direction as pork production, there was a significant decline in all meat production because of low beef slaughter. So even this isn't really an exception.

Pork, Beef Not Separate . . .

Pork (excluding lard), beef, veal, lamb and mutton are more or less substitutes for one another as viewed by consumers. So we can't isolate any one from the others and explain the behavior as if each operated in a separate vacuum.

It's clear that a large part of the unsatisfactory producer prices for cattle, hogs and their products in 1955 came from record-breaking expansion in total red meat supplies. Consumers were simply unwilling to absorb this supply at prices acceptable to farmers. Increased supplies of poultry and other protein foods were also a factor.

The impact on hog producers was particularly severe in the fall season. They were operating at a time when total supplies of meat per person were huge—when both cattle and hog numbers cycles were at their peak—and, further, in that part of the year when seasonal hog receipts are very large, with consequent price declines.

In addition to expanding supplies, beef and pork producers faced a situation in 1955 in which demand for meat grew more slowly than the demand for other foods. And the rather sharp declines in retail meat prices were still substantially less than the price declines for live meat animals—part of this due to the rising costs of processing and added consumer services.

Yet another disadvantage faced by hog producers is the declining portion of his dollar that the consumer is willing to spend for pork. This situation is shown in chart 7. Percentage of the consumer's dollar spent for pork dropped from 3 percent in 1947 following the war to 1.9 percent in 1955. During the same time, the portion of the consumer's dollar going for beef remained fairly stable from 2.7 to 2.9 percent. This changing trend for pork develops in part because consumers apparently find present-day pork too fat for their needs and preferences.

Adjustments . . .

Thus, it develops that hog producers have two important adjustment problems immediately ahead: (1) to adjust more effectively the numbers and weights of livestock production to market needs and (2) to develop meat hogs carrying less fat. In addition there is always a third problem of marketing—making effective decisions as to time and place of sale.

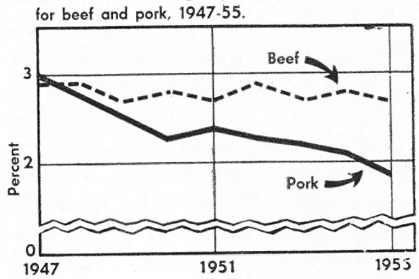
Hog producers were quick to recognize and to act on the opportunity to improve their position by adjusting hog numbers to a lower level in 1956. The June 1956 pig crop report indicated an 8-percent reduction in pigs saved for both Iowa and the nation. Intended fall reductions showed up as 8 percent for the nation and 12 percent for Iowa. Combined national spring and fall pig crops for 1956 were estimated at about 88 million head — down 8 percent from last year. This reduction may help avoid such high receipts and such low prices as prevailed in the last quarter of 1955.

Producers have also acted to adjust pork production by marketing hogs at lighter weights. In the first 5 months of 1955, average weight of all hogs marketed was 234.8 pounds — down 9.1 pounds or nearly 4 percent from a year earlier.

The adjustment to "meatier" hogs with less fat is coming more slowly. This is a longer-haul undertaking, involving care in breeding as well as in feeding. This continuing adjustment, however, should make it possible for producers to sell a larger output of hogs at more satisfactory prices.

Another source of producer self help is in deciding time and place of sale so as to get top returns. If production and marketing can be timed to minimize production and processing costs, it will be advantageous to do so. It's no secret, for example, that low summer receipts followed by the winter flood of hogs at processing plants doesn't favor the minimum processing costs in which producers, processors and consumers are all interested.

CHART 7. Percentage of consumer's dollar spent for beef and pork, 1947-55.



YOUR EXPERIMENT STATION REPORTS . . .

Vernal Still "Tops" In Alfalfa Trials

THE NEW alfalfa variety, Vernal, continued to give outstanding performance under Iowa conditions in 1955 performance trials conducted under the direction of C. P. Wilsie of the Iowa Agricultural Experiment Station.

Two-year performance tests on eight alfalfa varieties showed that Vernal produced the highest yields of forage both when harvested for hay, cut three times each summer, and when cut frequently (5 times) to simulate grazing. Wilsie believes varieties like Vernal offer a flexibility in management which is important. A considerably expanded use of alfalfa by Iowa farmers, in pasture mixtures as well as for hay, appears feasible.

Fundamental breeding studies on alfalfa are also under way. Crosses are studied for inheritance of such characteristics as erect and prostrate growth habit, coarseness of stem, leaf size and shape, pod shape, crown type and flower color. The Station is cooperating with other experiment stations in the Midwest on exchange of breeding material, evaluation of selections for disease resistance and the development of synthetic varieties.

Report 1955 Diseases Of Forage Legumes

THE MOST important diseases of alfalfa in 1955 were summer black stem and leaf spot, spring black stem, common leaf spot, *Stemphylium* leaf spot, downy mildew, *Fusarium* wilt and bacterial wilt. Diseases of minor importance were rust, yellow leaf blotch and anthracnose, reports J. W. Baxter of the Iowa Agricultural Experiment Station.

Yellowing of alfalfa stands was noticed in northern and western Iowa during May and early June. A survey of 80 fields in 28 counties showed the primary cause to be downy mildew. Baxter says that other causes of yellowing were *Stemphylium* leaf spot, *Fusarium* wilt, bacterial wilt, frost damage and 2,4-D injury.

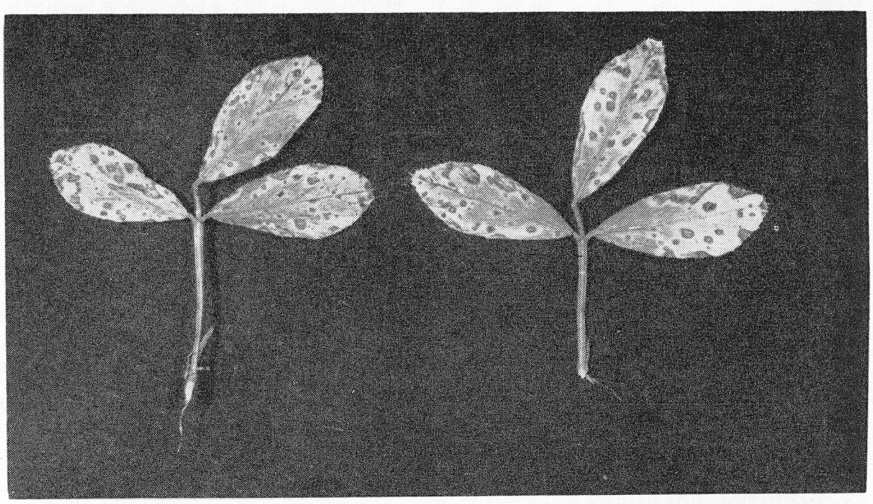
The most important diseases of red clover were angular leaf spot and black stem, root rot, northern anthracnose and bacterial leaf spot. Also present but of minor importance were rust, powdery mildew, southern anthracnose and *Stemphylium* leaf spot.

The most important disease of birdsfoot trefoil was foliage blight. *Stemphylium* leaf spot on trefoil was reported for the first time from Iowa in 1955.

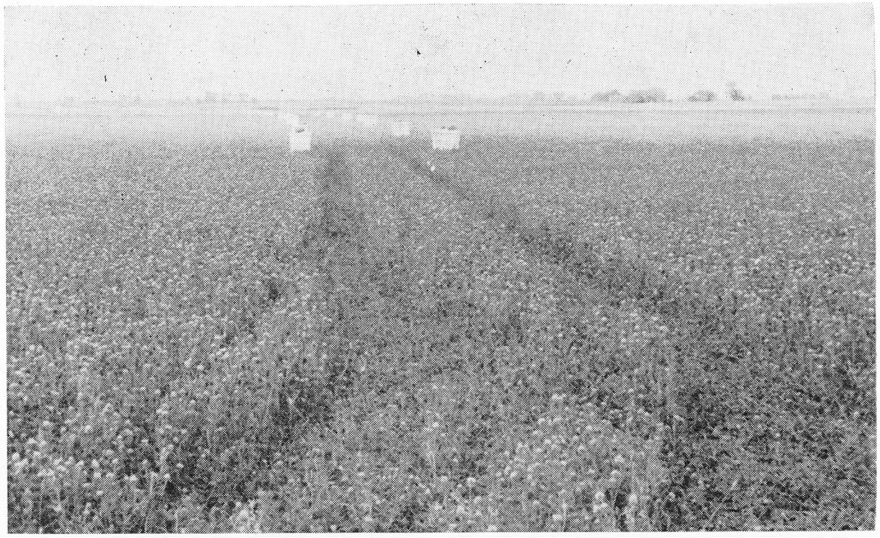
Disease surveys and observations in the breeding nurseries also were made to determine disease-resistant varieties. 1955 results indicated: Dollard red clover showed resistance to northern anthracnose. Dollard and Emerson red clovers showed some degree of resistance to root rot. Vernal alfalfa showed some degree of resistance to *Stemphylium* leaf spot.

Test Grain Sorghum Varieties, Hybrids, Rates of Planting

FIVE VARIETY tests, several demonstration plantings and a rate of planting test were con-



Stemphylium leaf spot was found on stands of alfalfa, red clover and birdsfoot trefoil in 1955 Iowa State College plant disease surveys. This photo shows the appearance of Stemphylium leaf spot on alfalfa.



Research indicates that placement of two colonies of honey bees per acre (as above) gives effective pollination of red clover grown for seed. But entomologists urge care in using insecticides such as DDT for insect control in fields where bees are used for pollination.

ducted with grain sorghum by the Iowa Agricultural Experiment Station in 1955. A total of 10 varieties and 13 experimental hybrids were used in the various plantings — though not all appeared in every test—according to R. R. Kalton, who directed the tests.

Average yield per acre of all varieties in any one test ranged from 30 bushels at Seymour to 78 bushels at Ames. Average yield per acre of all hybrids in any one test ranged from 38 bushels at Seymour to 95 bushels at Ames. The average yield superiority of hybrids over varieties for six tests was 27 percent. However, some hybrids were not better than many varieties. Thus, Kalton says, more extensive testing will be needed to determine the best adapted and most promising hybrids for any area.

Three rates of planting — 4, 8 and 12 pounds per acre — were tested at Ames. Yields were 82, 81 and 75 bushels per acre, respectively. These tests indicated that the heavier rates result in thinner and weaker stalks which may cause considerable lodging. Rates of 4 to 6 pounds per acre appear most desirable.

Study Adaptation Of Forage Crops At Different Locations

WORK ON the adaptation of several promising varieties of alfalfa, bromegrass, timothy and red clover alone and in mixtures has been conducted since 1949 at the Iowa Agricultural Experiment Station's outlying soil-type farms. These species and varieties are established annually in a crop rotation and are evaluated for hay.

Other pasture-type perennial forages are established at these farms and evaluated for pasture purposes by a system of frequent clipping. A stand establishment and stubble management study is also conducted. These experiments are conducted under the direction of H. E. Thompson, J. M. Scholl and H. D. Hughes.

In tests of perennial pasture forages, five perennial grasses grown alone and with each of three legumes and these legumes grown alone have been compared for several years at several locations. The plots were harvested at approximately monthly intervals throughout the summer with no harvesting from about Sept. 15 until the end of October. Results from locations other than those reported this year were given in previous reports.

At Beaconsfield and Clarinda, alfalfa and alfalfa-grass mixtures continued to show superiority over other species and mixtures in this trial. Ranger alfalfa stands have been maintained satisfactorily under the cutting schedule followed—alfalfas usually do not last longer than about 3 years under continuous grazing management.

Though Ladino clover reached its peak production in 1952 and had nearly all disappeared by 1953, the grass in plots which included the legume continues to outyield the grasses grown alone.

Perennial pasture forage test plots were established in Howard County in 1953 and harvested five times in 1954 and four times in 1955. The general behavior of alfalfa, Ladino clover and birdsfoot trefoil at this location is similar to that found in plantings made in other parts of the state.

- *Ladino clover* reaches its peak production the year following seeding after which it declines rapidly, and most of the original plants are gone after the second year.

- *Alfalfa* maintains a more uniform production throughout the life of the stand, and under this management wilt-resistant, northern adapted varieties can be expected to last for 3 to 5 years.

- *Birdsfoot trefoil* starts slowly and may not reach maximum production until 3 or 4 years after seeding and, under favorable conditions, may last for many years.

Alfalfa-grass and Ladino-grass mixtures have been more productive than these legumes grown alone. Birdsfoot trefoil, on the other hand, often produces more when grown alone. The five grasses (Kentucky bluegrass, timothy, bromegrass, tall fescue and orchardgrass) produced less than half as much in 1955 as in 1954. This decline is due primarily to nitrogen deficiency which occurs regularly with older stands of grass.

In experiments with grasses and legumes harvested for hay, bromegrass mixed with alfalfa and red clover gave higher yields than did alfalfa and red clover grown alone. Adding timothy to alfalfa and red clover decreased hay yields. But the addition of Ladino clover to alfalfa and red clover increased hay yields. The reverse was true in 1954. Alfalfa was definitely superior to red clover at Castana and Beaconsfield; the two crops

were about equal at Independence; and red clover was superior to alfalfa at Cresco.

European birdsfoot trefoil seemed to be better than Empire for hay in 1955. In 1954 there was no difference between the two trefoils. The hay yields from both trefoils were lower than those of alfalfa and red clover at Cresco, Independence and Castana. However, at Beaconsfield European trefoil produced more hay per acre than red clover — mainly because there was no third cutting of red clover.

Alfalfa variety trials established in 1951 and 1952 were harvested at Castana, Beaconsfield, Albia and Seymour. Ranger and Buffalo are beginning to show their superiority for long-time stands. During the first 2 years, Grimm and Ladak were the high-yielding varieties. In 1955 Ladak was still the high-yielding variety followed by Ranger and Buffalo. Bacterial wilt is beginning to thin the stands of Grimm, Cossack, the Commons and Ladak (to a lesser degree).

Granular Insecticides Control Clover Weevil

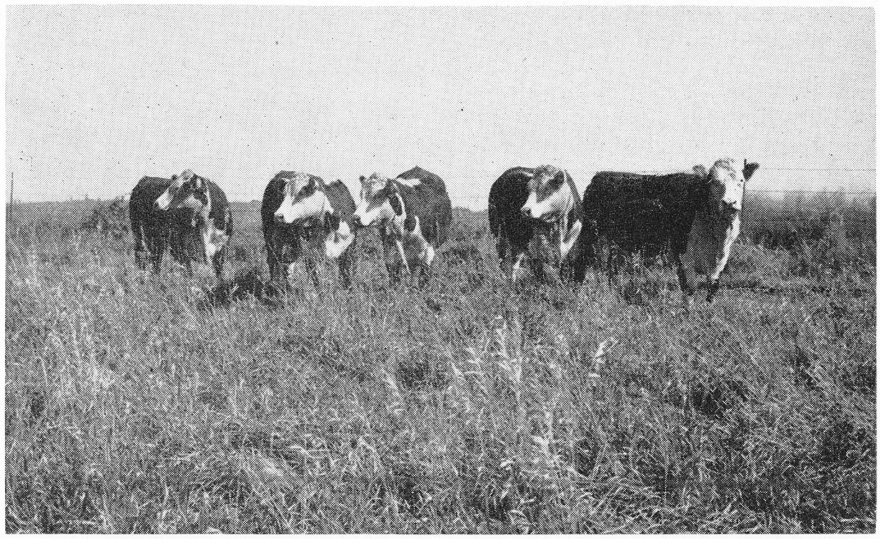
GRANULAR INSECTICIDES—dieldrin and heptachlor on a 30-60 mesh Attaclay carrier — were effective against the sweetclover weevil in Experiment Station tests at three locations in Iowa in 1955. The granular insecticides were applied separately with a grass seeder and mixed with the seed with a drill and an endgate seeder, respectively.

R. J. Walstrom and J. H. Lilly, who conducted these tests, report that the granular forms appeared to give about the same control as standard spray treatments recommended for this pest.

The advantages of granular insecticides are that water and spraying equipment are not needed and that the seed and insecticide can be applied in one operation. Walstrom and Lilly say that prices on these formulations will compete favorably on a cost basis.

Cropping Systems May Hold Clues To Erosion Problems

THERE IS an urgent need for better cropping systems in western and southwestern Iowa. Soil loss resulting from cropping practices which involve high percentages of land in row crops is a major problem.



Iowa State College agronomists, animal husbandrymen and economists are cooperating in studies of pasture use and management for western and southwestern Iowa. Related effects of pasture management on soil conservation and other rotation crop yields are also being studied.

Consequently, Iowa State College agronomists, animal husbandrymen and agricultural economists are cooperating to compare methods of producing, managing and utilizing brome-alfalfa rotation pastures. They are also studying the effects of this program on soil conservation and on the yield of other crops in the rotation. Included in the study are comparisons of various combinations of corn, protein and stilbestrol with the forage which is fed as pasture or as silage.

Two experiments were conducted on this problem at Shenandoah. The first experiment was to test the effect of winter gain on summer performance of choice Hereford steer calves fed fresh chopped brome-alfalfa with varying amounts of corn. Results showed: (1) Cattle wintered to gain ½ pound daily made higher summer gains than those wintered to gain 1½ pounds, and (2) the lower rate of winter gain resulted in a higher cost per pound of gain in winter, but the summer gains following were cheaper than for those wintered at a higher gain.

In the second experiment, the performance of choice Hereford steers fed brome-alfalfa (1) as fresh chopped forage, (2) by rotational grazing and (3) by continuous grazing was compared. It was found that carrying capacity was increased regularly by soilage as compared with grazing. Carrying capacity was increased by rotational grazing compared with continuous grazing, and it was over twice as much for soilage as for continuous grazing. Daily gains were highest for continuous grazing, intermediate for rotational grazing and lowest for soilage. However, these results were obtained in drouth years. Under more normal conditions, the daily gains can be expected to be similar for all three managements.

Other experiments were conducted at Castana to compare (1) alfalfa-brome fed fresh chopped and grazed when fed with limited corn and no corn during the pasture season, (2) the above treatments with and without stilbestrol and (3) cattle full-fed corn on pasture with stilbestrol and full-feeding without stilbestrol. Results in 1955 showed:

- Carrying capacity was almost doubled when alfalfa-brome was fed fresh chopped compared with grazing management.
- Rate of gain was similar for grazing and soilage. This included both the limited corn feeding and the "no corn" treatments during the pasture season and also for

the entire period—which included the pasture and finishing periods.

- It took only about half as much corn to produce choice quality steers by grazing and soilage without corn during the pasture season and then finished on a full feed of corn as it did with similar managements which required a limited feed of corn during the pasture season.

- Stilbestrol did not increase gains with any feeding or grazing management except where a limited feed on corn was fed. Then the increase due to stilbestrol was about 7 percent.

- There was a slight advantage in cost of gain in favor of grazing over soilage, both in managements that included no corn during the pasture season and in those that included a limited feed of corn during this period.

J. M. Scholl, W. H. Hale, E. O. Heady, Wise Burroughs, R. M. McWilliams, W. D. Shrader and H. D. Hughes are working on this project.

Test Direct Combining Of Desiccated Trefoil

YOUR EXPERIMENT STATION is conducting continuing tests on the direct combining of desiccated birdsfoot trefoil. Several desiccating chemicals have been tested to determine their effectiveness on birdsfoot trefoil and bromegrass. Some were found to be more effective than others in drying foliage of trefoil and seed and foliage of bromegrass.

Use of chemical desiccants shows considerable promise for birdsfoot trefoil seed production. Under favorable conditions of low relative humidity and high temperature, it's possible to direct combine the field 24 to 48 hours after spraying with little loss from shattering. The latest results from these tests were reported in the June 1956 issue of IOWA FARM SCIENCE.

Similar tests with bromegrass showed that the use of desiccants for drying bromegrass before seed harvest, in general, is *not* practical unless the fields are extremely weedy or unless legumes are present. Presently available chemicals do not lower moisture percentages in the seed itself without reducing germination. Therefore it is not worthwhile to use this method to aid harvesting of bromegrass seed.

Key personnel working on this study include staff members in the departments of agronomy (farm crops) and agricultural engineering.

List Chief Diseases Of Sweetclover in 1955

THE MOST important diseases of sweetclover in 1955 were stem canker, spring black stem, summer black stem and leaf spot, Leptosphaeria leaf spot and *Fusarium* wilt reports John Baxter of the Experiment Station.

During June and July a destructive wilt appeared in experimental plots of second-year sweetclover near Ames. Leaves of plants infected with this wilt yellowed and wilted until, finally, the entire plant died. This wilt, as yet, is unidentified though it's known to be a species of *Fusarium*. Baxter reports that greenhouse tests showed the fungus to be harmful to sweetclover seedlings, indicating that it may be important in reducing first-year stands.

Breeding studies on sweetclover, under the direction of I. J. Johnson and M. M. Hoover, Jr., are directed toward developing varieties resistant to these diseases with vigorous plant growth and growth habit.

Test Viability, Yield Of Bluegrass Seed

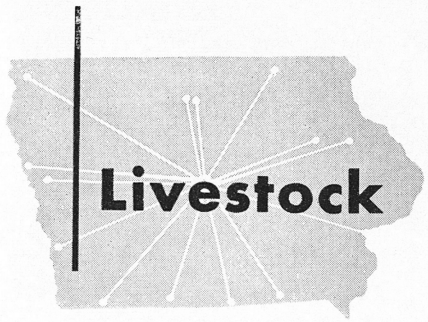
THE USE of sealed containers to maintain the viability of Kentucky bluegrass seed is being studied at the Iowa Agricultural Experiment Station under the direction of L. N. Bass. The moisture content of bluegrass seed has been adjusted to various levels. And the seed has been sealed in tin cans and plastic bags at several temperatures. This study is set up to cover a 5-year period. At periodic intervals two plastic bags and two cans will be removed from storage for each treatment and the seed tested for germination.

Bass reports that some work also has been done on temperature of germination in an attempt to determine the lowest temperature at which germination will take place. This work will be continued.

In other experiments with Kentucky bluegrass seed, studies of the relationship of rainfall and seed yield were continued on a regional rather than a statewide basis. Bass reports that this method involves only those areas of a state where bluegrass seed is harvested and, thus, gives a more accurate picture of the relationship of rainfall to bluegrass seed yield.

Research plots used to test and observe the characteristics of perennial legumes and grasses also provide visitors a first-hand view of differences between varieties and mixtures. These plots are at the Carrington-Clyde Experimental Farm located in Buchanan County.

YOUR EXPERIMENT STATION REPORTS . . .



Cattle on Stilbestrol Show Increased Gain

CATTLE receiving stilbestrol gained 12 percent faster with 8 percent less feed per unit of gain than did control cattle receiving no stilbestrol in one phase of a study conducted by the Iowa Agricultural Experiment Station. Dressing percentage of the cattle was slightly higher in the stilbestrol-fed cattle and carcass grades were slightly higher in the control cattle.

In another area of the study, feed costs were lowered approximately 1½ cents by using a supplement containing stilbestrol. Also, it was found that the combination of stilbestrol and cholesterol was not quite as effective as stilbestrol added alone.

Stilbestrol was fed to test cattle to determine whether breeding performance would be impaired in another phase of this study. All the heifers on test were bred at the end of a 196-day feeding period and all conceived.

Wise Burroughs is in charge of this study being conducted jointly by the departments of Agricultural Engineering and Animal Husbandry.

List Reasons For Hog Price Drop

IN THE FIRST 5 months of 1955, monthly average prices of barrows and gilts averaged about $8-$9 lower per hundredweight than a year earlier. Prices continued to average lower than a year earlier for the remainder of 1955.

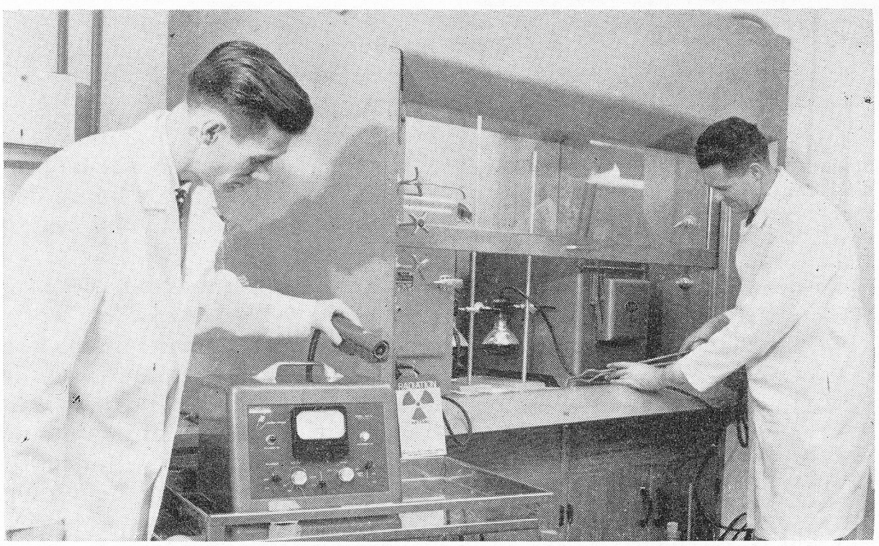
Sam H. Thompson of the Iowa Agricultural Experiment Station says that a good part of the sharp drop in hog prices in the fall of 1955 can be attributed to three factors: (1) There was a large expansion in hog production; supply exceeded demand. (2) Consumers have strengthened their preference for beef, and beef supplies were large. (3) The usual seasonal decline in hog prices came with increased marketings in the fall and winter months.

Other factors, Thompson says, included higher wages for labor, higher retail margins, more services involved and somewhat higher packer margins.

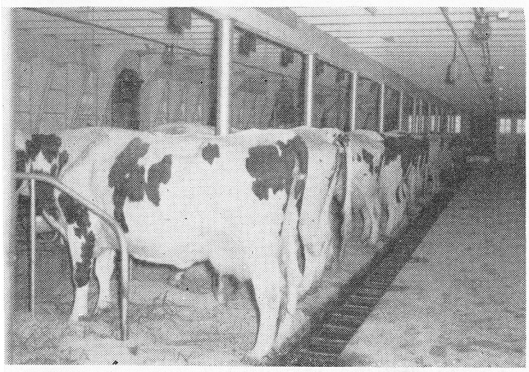
Producers, he adds, can be most effective in trying to produce the quality and quantity of product most in line with consumer demand, though timing of production to avoid bunched marketings which may increase processing costs is another possibility.

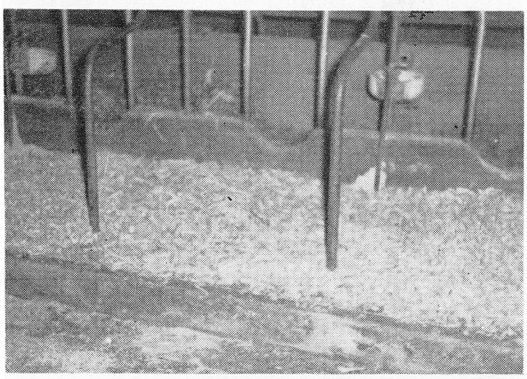
Antibiotics Stimulate Dairy Calf Growth

THE COMPARATIVE effects of feeding aureomycin, terramycin, penicillin, bacitracin, chloromycetin and 3-nitro-4-hydroxyl phenyl arsonic acid to dairy calves are



This photo shows a part of the interior of the radioactive isotope laboratory in the college's new dairy cattle nutrition barn. The laboratory is being used in studies with radioactive phosphorus and calcium. The studies with phosphorus are providing information on certain phases of animal use of this element in growth. Radioactive calcium is being used to study skeletal growth and animal usage of this mineral. Research scientists have organized and designed these studies to provide information entirely unavailable before development and use of radioactive tracers in nutrition research.





Dairy husbandrymen and agricultural engineers are studying the effects of different types of stalls on the comfort, health and cleanliness of dairy cows. The top photos show two of the stall arrangements studied. Bottom photo shows coarsely ground wood chips tested for use as bedding.

being studied at the Iowa Agricultural Experiment Station under the direction of N. L. Jacobson and R. S. Allen.

In all cases except penicillin, body weight gains for calves fed with the antibiotics were greater than the gains of control groups not fed antibiotics. The treatments that stimulated growth also improved efficiency of feed utilization. The most rapidly gaining groups also attained greater height at withers and appeared somewhat superior in condition and hair coat at completion of the experiment. However, these differences were not marked.

Bloat Research Involves Many

SCIENTISTS in animal husbandry, dairy husbandry, chemistry, veterinary physiology and agronomy are continuing to combine their research in an effort to obtain more information on the causes, treatment and prevention of bloat.

Dairy husbandry and chemistry researchers are conducting tests designed to evaluate bloat preventives. Treatments used in recent tests were trisodium phosphate and an alkyl-aryl-sodium-sulfonate-type detergent.

Trisodium phosphate did not have a noticeable effect in reducing either bloat incidence or severity. Though the detergent had little effect on bloat at low dosage levels, the highest dosage level used reduced both severity and incidence during the treatment period. However, these tests require further study before recommendations can be made on the usefulness of this detergent as a preventive for pasture-type bloat.

Work with various diets fed in drylot combinations has been evaluated to learn the combinations of diet ingredients which cause bloat. However, bloat could not be produced at will in all animals fed any one diet, and individual variations were great.

Researchers in veterinary physiology have been conducting a preliminary study to determine the role the enzyme urease plays, if any, in the production of bloat. Work will continue in this phase.

The Department of Animal Husbandry is studying the feeding of fresh legume forage, which increases rumen ammonia, and the relationship of this ammonia to bloat.

Pure stands of alfalfa, Ladino clover and birdsfoot trefoil are being established for use in these experiments.

Bloat research along these major lines will continue, with some new areas being incorporated into the experiments.

Among those cooperating in this work are N. L. Jacobson, R. S. Allen, W. Burroughs, W. H. Hale, L. C. Payne, J. M. Scholl and Lester Yoder.

Compare Effect of Stall Types on Dairy Cows

THE EFFECTS of different types of stalls on the comfort, health and cleanliness of dairy cows are being compared at the Iowa Agricultural Experiment Station.

Observations and records are being made on the health of the cows, cleanliness of cows and stalls, bedding requirements, labor requirements, temperatures at the stalls at various times of the day and night, time cows spend lying down and milk production.

In addition, the use of wood chips, corn husks, sawdust and corncobs as bedding for dairy cattle are being studied. All materials show promise — though the corncobs and wood chips may need to be coarsely ground or chopped for best results.

C. F. Foreman, A. R. Porter and N. H. Curry have been conducting this study.

Test Growth Factors In Swine Nutrition

EXPERIMENT STATION researchers are conducting studies to evaluate new, and re-evaluate old, antibiotics and other growth factors in swine nutrition. This work is being carried on under the direction of Damon V. Catron.

Two experiments made up the final tests to re-evaluate calcium and phosphorus levels for growing-finishing swine in concrete drylot. When the information from these experiments was combined with that of earlier experiments conducted in 1953-54, the dietary level of calcium and phosphorus needed—based on rate of gain, feed efficiency, weight, breaking strength and ash of femurs—was from 0.8 percent calcium and 0.7 percent phosphorus for pigs up to 100 pounds and 0.7 percent calcium and 0.6 percent phosphorus for growing-finishing swine from 100 to 200 pounds.

The ability of pigs to utilize non-protein nitrogen in the form of urea was studied in other experiments. Adding urea to various protein levels in pig rations failed to improve rate of gain or feed efficiency. From these studies it was concluded that urea is not a practical ingredient for use in rations for growing-finishing swine. Growing-finishing swine can't utilize enough of the urea to be of practical use.

Low and high oil corn was fed pigs in an experiment conducted in cooperation with the agronomy department. In another, 10 different levels of fat in the pig ration were tested. There were no important effects of the various ration treatments on rate of gain, feed efficiency or certain carcass characteristics.

Swine Breeding Tests Show Growth Rates

POLAND CHINA, LANDRACE and DUROC hogs have excelled in growth rate in 2-year tests at the Iowa Agricultural Experiment Station. The Yorkshire, Landrace and Poland China have excelled in carcass quality, and the Yorkshires were most prolific but were somewhat slow in growth rate.

New techniques of probing live hogs were investigated this year, according to L. N. Hazel, director of the project. Deep probing through the muscle to measure the depth of the muscle to the surface of one of the flat bones was investigated. Results of these tests have not been completely analyzed, but the additional information obtained by measuring the depth of lean does not appear to increase the accuracy of already existing methods of measuring carcass quality.

The tests are being conducted in cooperation with the USDA. Future plans call for starting a new cycle of intensely inbreeding many small lines in the four best breeds.

Attempt to Develop Least-Cost Rations

CORN-SOYBEAN OILMEAL rations containing various levels of protein were fed to six groups of pigs in an experiment to develop least-cost rations for growing-finishing swine. The information from this experiment and that from an earlier experiment were combined to work out a least-cost ration program for growing-finishing pigs on pasture. When balanced rations containing various protein levels were fed from about 30 to 200 pounds, the maximum rate of gain was obtained on a 16-percent protein ration, but the minimum feed per pound of gain occurred with a 12-percent protein ration. The different ration treatments had no consistent effect on carcass fatness, reports Damon V. Catron who is directing these studies.

Several groups of pigs were fed on pasture to contrast the economy of least-cost, least-time and free-choice rations for growing-finishing pigs in another experiment. Least-cost rations resulted in a saving of 25 cents per 100 pounds of gain compared with the least-time rations. In the free-choice lots, there was a spread of as much as 3 dollars per hog in the amount of protein consumed by the pigs.

Antibiotics Tested Fail to Influence Hog Carcass Quality

INCLUDING aureomycin or terramycin in a corn-soybean oilmeal ration fed growing pigs had no important effect on carcass quality in two experiments conducted by Joe Kastelic of the Iowa Agricultural Experiment Station. Measurements were made on length of carcass, specific gravity, percent lean cuts, cross-section area of the loin muscle, live probe, depth of backfat and weight of leaf fat from 102 swine carcasses. The test rations were fed to the pigs throughout the feeding period without altering the composition of the rations.

In other tests, feeding various protein levels to pigs resulted in carcasses with a greater proportion of lean as the protein increased. However, Kastelic points out that the increase in lean was so small it would be of minor consideration when a choice must be made between two adjacent protein levels.

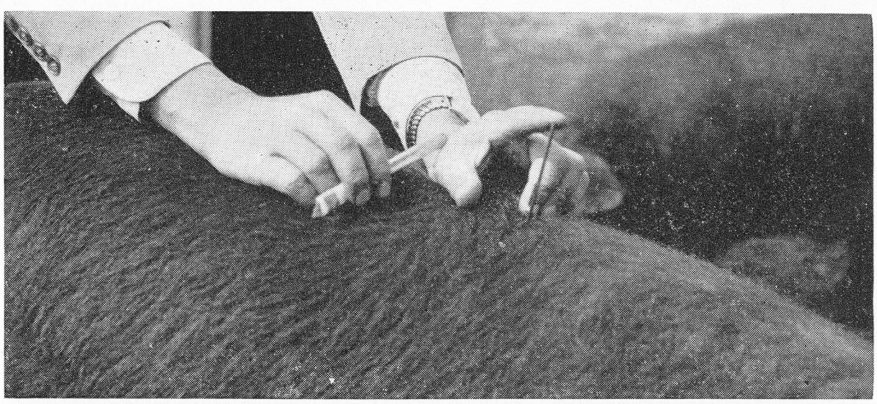
Study Stilbestrol Effects on Beef Carcass Quality

STUDIES AIMED at determining whether orally administered diethylstilbestrol has any influence on carcass characteristics of beef cattle are being conducted at the Experiment Station.

Joe Kastelic, project leader, reports that results do not give evidence that feeding stilbestrol has any consistent influence on carcass characteristics as measured by carcass grade, the fat, lean and bone content of the 9-10-11 rib cut and thickness of fat over the rib eye muscle.

Lamb Gain Increased With Stilbestrol

LAMBS fed stilbestrol with a cob ration showed the best rate of



Though new techniques are being studied, this photo illustrates the presently accepted method of mechanical probing for fatness. An incision is made through the skin, and a small metal ruler is pushed through the fat until it rests on the pork chop muscle.

gain in experiments under the direction of Wise Burroughs of the Iowa Agricultural Experiment Station.

Twelve lots of 20 lambs each were placed on experiment and fed for an 80-day period to determine the effect of diethylstilbestrol, squalene and cholesterol, hydrogenated fat and finely ground corncobs in their rations.

Adding 2 milligrams of stilbestrol per lamb per day in connection with the cob rations increased rate of gain by 25 percent with no reduction in carcass grades. Replacement of two-thirds of the hay with finely ground cobs gave good results, but not as good as those obtained in a previous trial.

Addition of 3 percent hydrogenated fat failed to improve gains, but there was some suggestion that carcass quality was improved. The addition of 2 milligrams of stilbestrol per lamb per day to the ration containing hydrogenated fat increased rate of gain 11 percent.

Adding a combination of cholesterol and squalene reduced rate of gain but had no effect upon carcass quality.

Emphasis on Carcass Quality in Beef Studies

TWO LINES are being developed in each of three major beef breeds as researchers seek to improve beef cattle through breeding. This work is being carried on under L. N. Hazel of the Iowa Agricultural Experiment Station with the cooperation of the USDA.

Emphasis in developing lines is on growth rate, low feed requirements, beef conformation and reproductive ability. Research emphasis is being placed upon carcass quality, with as many of the calves as possible being slaughtered for carcass studies. Relationships between carcass quality, growth rate, feed requirements and live animal conformation are of primary interest.

In a study of the dwarf problem, radiographs of the loin vertebrae on young calves are being examined as a method of determining whether a calf is free of the dwarf gene. However, greatest emphasis is being placed on the problem of carcass quality in cattle. The addition of another herd for study will aid this project by making more animals available for carcass analysis.

Study Wind Effect On Animal Shelters

WIND LOADS on various industrial and agricultural structures have long been of interest to designers. More recently, air movement within animal shelters and its effect on the animal's thermal development has come under study by agricultural engineers.

Agricultural engineers under the direction of Henry Giese and G. L. Nelson are studying the air velocity patterns over and within open front shelters. They also are evaluating the wind forces on structures of this type as affected by: (1) the building width, (2) the roof slope, (3) the amount of back wall opening, (4) the windward barrier position, (5) the windward barrier height and (6) the amount of opening in the windward barrier.

Some preliminary tests were made on a small scale model shelter. The air flow over the model shelter was found to be very sensitive to the height and location of the windward barrier. The air flow through the shelter was directly affected by the amount of rear wall opening. If 40 percent of the rear wall was open, air flow through the structure was not obstructed regardless of whether or not there was a windward barrier.

Seek to Increase Value Of Forages, Roughages With Better Rumen Function

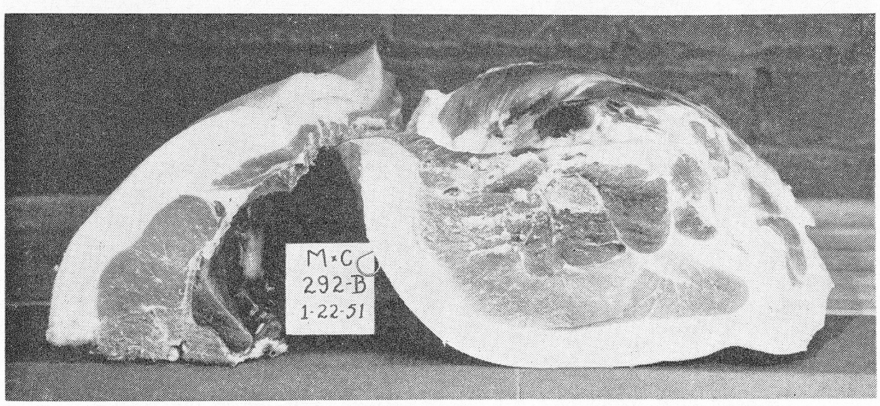
TESTS SEEKING to increase the usefulness of forage crops and high-cellulose roughages through improved rumen function in beef cattle and sheep are being carried on at the Iowa Agricultural Experiment Station.

One of the principal results achieved so far is the development of an artificial rumen technique whereby the availability of phosphorus in various feed sources can be measured rapidly and at a minimum expense. The importance of this technique in cattle and sheep feeding experiments is being tested.

The artificial rumen studies also pointed up the fact that high levels of sodium and potassium have an influence on cellulose digestion. Some progress has been made on isolating an unidentified factor, present in certain high-protein feeds, which is beneficial to rumen microorganisms.

Other tests suggest that estrogenic hormones contribute to cattle nutrition by improving protein utilization of feeds consumed. Researchers are also trying to synthesize an androgenic hormone which may be important in cattle nutrition.

Wise Burroughs, who is directing these tests, reports that still further findings in areas of this study may lead to safer methods of using larger quantities of urea and other sources of non-protein nitrogen in cattle and sheep rations.



Here is an untrimmed ham and loin from a meat-type hog. More pork like this, with relatively less fat and more lean than from lard-type hogs, means more customers for pork, researchers say.

Farm Outlook . . .

DEMAND for farm products should be slightly stronger in 1957 than in 1956. Business should continue to operate at a high level, though it won't improve as much as it did last year.

Weak spots in the past 12 months have been housing and automobiles. But they have been offset by a rise in consumer buying and an increase in investment in new factories and equipment. Businessmen also have spent more money to add to their inventories.

Looking ahead to next year, continued rise in consumer spending as a result of increased incomes is likely (though the rate of rise in consumer incomes has slowed down). Also, the new highway program voted by Congress should give a boost to government spending. Thus, while the boom shows signs of topping out, there is enough strength to prevent any real difficulty in 1957. We should see some rise in farm demand in 1957. This increase in demand won't be as strong a pushing factor on farm prices as in the past year. But it still should be enough to give a little additional push. Probably the most important factor affecting farm price changes next year will be changes in supply.

Soil bank payments helped support farm income in drouth areas this year. Next year, still larger payments in total will be made. But this won't be a net gain. Part of the soil bank income will be offset by the lack of crop income from those acres put in the soil bank.

Farm income for the nation as a whole in 1956 probably will be about the same as in 1955. The halt in the several-year downtrend in farm income came as a result of the higher level of price supports announced by the USDA this spring, smaller crops, a cutback in livestock output (chiefly fed cattle and hogs in the last half of 1956) and soil bank payments.

Livestock . . .

The general long trend toward an expansion in livestock production continues. But this year marks a let-up in the rising trend in total meat output since 1948.

Beef has shown the greatest rise. Beef output has doubled since 1940. Pork has gone up only 10 percent in this time.

Production of meat *per person* has gone up rapidly since 1951. This year we're within 1 pound of the all-time peak of 163 pounds per person set back in 1908.

Pounds of Meat Consumed Per Person.

Meat	1955	1956
Beef	81.2	82.5
Veal	9.4	9.1
Lamb and mutton	4.6	4.5
Pork	66.0	66.5
Total	161.2	162.6

Supply of meat per person next year will be a little less than in 1956 — unless a major drouth causes a livestock liquidation. In the second half of 1956, total meat production will fall a little short of the figures for a year earlier. This is the first time this has happened in 5 years. But total production still is second largest on record.

Cattle . . .

Cattle feeding profits in the coming year will average better than in the year just ended. But they won't be extremely large. And the kinds of cattle which show the best profit will be different.

Last year, feeding heifers and medium-grade cattle paid better than normal. There was an excessive supply of big, long-fed cattle. So buyers were interested in the lighter carcasses of the heifers and the less well-finished carcasses from the medium cattle. We're not likely to have a repetition of this glut of big long-fed cattle. So profits from feeding heifers is likely to be more normal in 1957.

Meanwhile, the drouth in the western Corn Belt is increasing the demand for medium feeder cattle which can be finished out with roughage and a minimum of corn. It has pushed up the price for this grade of feeders. And supplies of this grade of slaughter cattle may be excessive in late winter and early spring. The area hurt by the drouth normally feeds cattle for the spring market. Supplies of well-finished fed cattle for the spring months probably will be less than a year ago.

But there probably will be more long-fed cattle for the summer and fall months. The area which normally produces cattle for this period has a good corn crop. Profits on long-fed cattle this fall are good. And numbers of light cattle being put on feed this fall and headed for that market are up from last year. Profits on choice cattle sold next spring will be better than a year earlier; those on cattle sold late next summer and in the fall are not likely to be as good.

Total cattle numbers on feed on Jan. 1 are likely to be about the same as a year ago. However, fewer probably will be headed for the spring market and more for the fall market of 1957.

This year's calf crop is estimated to be about the same as last year. This means that slaughter and birth rate of our national cattle population is about in balance. So any change in cattle numbers on Jan. 1, 1957, will be small from the figures of a year earlier.

Hogs . . .

This spring's pig crop was 8 percent smaller than the big crop of the spring of 1955. The main reduction was in the late spring litters. This means that the principal reduction in slaughter will come in the latter part of the fall and early winter. Slaughter from

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October on should be significantly below last year's levels.

But slaughter will still go up in total from the levels of September. In other words, October's slaughter will be up from September; November, from the level of October. Thus, the seasonal price drop will come again this year—despite the cutback in late farrowings.

The low in hog prices probably will come between mid-November and mid-December. It should be $2 to $3 higher than the low of 10-cent hogs of a year ago. The winter price recovery from this low should be fully normal.

If farmers follow through on their June intentions to cut back fall pig output, the hog-corn ratio in 1957 should be about average.

Soybeans . . .

A record smashing soybean crop is moving to market. It easily could push soybean prices below the loan level at the peak of the harvest movement. Chances of a sizable rise in soybean prices from the loan level are not good. But if soybean prices are depressed at harvest time, they're likely to work back up to the loan level or perhaps 10 cents above.

The big problem in soybeans this year will be to move the soybean meal. Smaller supplies of cottonseed oil and lard will help support the soybean oil prices. Last year the freeze in the Mediterranean area of Europe plus the poor Argentina sunflower crop pushed soybean oil prices up in the winter and early spring. These areas have prospects for better crops this year. So export demand for oil isn't likely to be quite as strong as last year. Soybean meal, however, was a drug on the market this past year. We can't throw a still larger crop on top of this without seriously depressing prices.

Feed Grains . . .

Iowa's corn crop this year can be summed up thus: Where it's good, it's very good; and where it's poor, it's terrible.

The eastern Corn Belt has a good crop. This means that the Chicago cash market will have an ample supply of corn. Iowa and Nebraska prices this year will be high compared with Illinois farm prices and with the cash market.

Corn prices this winter will depend upon how much the USDA sells out of CCC stocks and how much goes under loan. The cutback in the 1956 corn crop from the harvest of last fall is largely offset by the cutback in hog production. Despite the $1.25 loan available to all corn this year, lots of Illinois farmers don't have storage to take advantage of this loan. Thus, corn in Illinois is expected to sell below the $1.25 loan at harvest.

Iowa corn prices are likely to be higher at harvest than a year ago. But they're not likely to work as high in the spring. The forces which pushed corn prices up in the spring of 1956 are not expected to repeat the process in 1957.

The forces which have encouraged the long-term increase in livestock output persist. Those are the output of feed grain on diverted acres from wheat and cotton and the search for added farm income to offset the drop in farm income of the last 5 years.

Whether the soil bank program can do more than stop the rise in farm output remains to be seen. This year's experience was not a true test since the program started so late. Actually, it turned out to be little more than a drouth relief program.

Will enough land go into the soil bank? That depends upon the rate of payment announced by the Secretary of Agriculture and the loan rate on corn, wheat and cotton.

At this time, however, it appears that the most likely prospect is for total feed grain output to remain large enough over the next few years so that feeding rations will be no better than average, or perhaps a little below normal.

Poultry . . .

Egg profits are likely to be poorer during the first half of 1957 than they were during the same period of 1956. Total supply of eggs is likely to be about 5 percent larger. About 7 percent more pullets were hatched up to May than a year ago.

This could mean 15 to 20 percent lower egg prices this winter and spring from the levels of a year earlier.

If past relationships hold, this should discourage farmers from buying chicks; and in turn, egg profits should be satisfactory during the last half of 1957.